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The Expectation of Life in Circulatory Disease.
By G. A. Gibson, M.D., Principal Medical
Officer to the Life Association of Scotland
Abstract of Discussion thereon
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The Expectation of Life in Circulatory Disease. By G. A. GIBSON,
M.D., Principal Medical Officer to the Life Association of Scotland.

[Read before the Faculty, 12 December 1910.]

THE subject with which you have invited me to deal on this occasion is one of great importance, but it is hedged about by so many uncertainties that it is of more than ordinary difficulty. Many attempts have been made to solve the problems which arise from its consideration, and it may possibly be regarded as almost outworn; yet, with the growth of knowledge in the present day, it is one which permits useful reconsideration.

PROGNOSIS IN MEDICINE.

In the dawn of civilisation man has ever sought, with hungry longing, to pierce the gloom hiding the future. Amongst the primitive people of the present time, far from the throbbing centres of civilisation, there are abundant opportunities for observing the intense eagerness with which attempts are made to forecast coming events. The Witch Doctors and Medicine Men amongst these untutored tribes practise incantations and study auguries with an earnestness quite equal to what was witnessed in the early days of Rome. In later stages of development, amongst nations which have passed the turning-point of progress, and are trembling on the edge of the downward slope of decadence, there is less yearning to discover what the future has in store. The Augustan poet frequently touches this subject, but perhaps nowhere more strikingly than in the beautiful ode¹ which, for

¹ Horace, *Carmina*, lib. i., car. 1.

most of us, is unfortunately apt to be associated with the strenuous efforts of our teachers in youth to drive the sense into our brains, even by forcible physical methods.

In practical medicine, it is absolutely impossible to separate prognosis from treatment. The close relation between the ability to forecast events and the power to modify their course is well recognised, even in popular phrase. It is to be admitted, nevertheless, that an opinion to the contrary has at times been urged; one of the greatest medical teachers of modern times¹ has, for example, stated that "*The prognosis* (or foreknowledge) of the course and event of disease has but little connection with the art of healing." This is certainly a hard saying to have been penned by the eloquent Watson, in those lectures which we still regard with admiration. It is assuredly unscientific to minimise the influence upon action which foreknowledge must exert.

If it be true of any department of knowledge, it is undoubtedly true of medicine, that "The present holds in it both the whole of the past and the whole of the future."² It is impossible to conceive of any attempt to solve the problems connected with the origin, without, at the same time, striving to forecast the probable results, of disease. Hume³ puts the matter most clearly when he states: "Determined by custom to transfer the past to the future in all our inferences," and we cannot act otherwise than project the results of previous experience into the forecast of future possibilities. The "*mens provida rerum futurarum*" of the Roman orator⁴ is of an importance in medicine, as well as other realms of practical knowledge, that cannot be over-estimated. It is the duty of all of us who profess the art of healing to do our best to cultivate this character of mind; for, as the Father of Medicine⁵ put it, five centuries before Christ: "He will manage the case best who has foreseen what is to happen from the present state of matters."

The elements of prognosis, in respect to heart disease, have received, in recent times, considerable attention. The observations of Clark,⁶ Pye-Smith,⁷ and Broadbent,⁸ during the final quarter of last century, have focussed attention upon the subject, and some of the views which these writers have expressed will require our attention in the following remarks.

¹ Watson, *Lectures on the Principles and Practice of Physic*, Lecture 8.

² Carlyle, *Past and Present*, Book I., chap. vi.

³ Hume, *Essay* xxxix., sect. vi., 7a.

⁴ Cicero, *De Divinatione*, lib. II., sect. lvii.

⁵ Hippocrates; Adams' Translation, *Prognostics* I.

⁶ Clark, *Brit. Med. Jour.*, 1887, vol. I.

⁷ Pye-Smith, *Trans. Hunt. Soc.*, 1891.

⁸ Broadbent, *Heart Disease*, chaps. vi. and vii.

PROGNOSIS AND EXPECTATION.

The expectation of life in assurance bears a close relation to prognosis in medicine. Although differing in many respects, they may be regarded as running on parallel lines. In the former, we deal with lives which must, for acceptance, present the most hopeful features as to prospects of longevity; in the latter we frequently find ourselves in the presence of affections which reduce the hopes of the future to zero. It is probable that nowhere in the whole field of life assurance are there such difficulties in forming a correct estimate of all the possibilities, as in instances where the circulatory apparatus is somewhat impaired. Herein lies the immense importance of the subject with which you have asked me to deal.

When we take up the statistics of the various Life Assurance Offices, our attention is at once arrested by the large proportion of deaths due to circulatory disease.

In the interesting paper on the Medical Selection of Lives for Life Assurance¹ by Davidson, he gives a table, founded on the public mortality experience of one of the largest offices in this country, showing the greatest sources of mortality among their assured lives before the age of 60. Out of a total of 3426 deaths during seven years, 1601 took place before the age of 60, and of these deaths the principal causes were :—

Respiratory System,	.	.	.	411
Circulatory	„	.	.	383
Hepatic	„	.	.	110
Renal	„	.	.	83
Malignant Disease,	.	.	.	83
Violent Deaths,	.	.	.	108
				<hr/>
				1178
				<hr/>

As these causes account for 1178 of the 1601 deaths, the remaining causes taken together seem to have much less importance.

In this particular paper the author points to the enormous percentage of deaths occurring among assured before the age of 60 as the result of disease of the circulatory apparatus, and he emphasises a point which we all know—that serious defect of the heart may exist in those who are, to all appearance, most healthy.

In Claud Muirhead's² valuable report on The Causes of Death among the Assured in the Scottish Widows' Fund, he gives a

¹ Davidson, *On the Medical Selection of Lives for Life Assurance*, 1889.

² Muirhead, *Causes of Death among the Assured in the Scottish Widows' Fund*, 1874-1894.

table, which is here somewhat modified so as to include all the circulatory affections, including deaths due to disease of the arteries of the brain :—

Disease of Heart—undefined, . . .	487
Valvular Disease of Heart, . . .	339
Fatty Degeneration of Heart, . . .	162
Syncope,	121
Enlargement of Heart,	84
Angina Pectoris,	76
Rupture of Heart,	4
Embolism,	38
Endocarditis,	16
Pericarditis,	20
Aneurism,	69
Atheroma,	8
Disease of Cerebral Vessels, . . .	924
	<hr/>
	2348

The mortality from heart disease (apart from disease of the vessels) during the twenty-one years, according to Muirhead, was as follows :—

PERIOD.	Ages under 35.		Between Ages 35 and 45.		Between Ages 45 and 55.		Between Ages 55 and 65.		Between Ages 65 and 75.		Ages 75 and over.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1874-94	22	1·73	102	8·01	204	16·03	329	25·85	427	33·53	189	14·85

while the annual mortality from heart disease (again distinguished from vascular affections) among 10,000 men, living at each group of ages, and at all ages, was as follows :—

PERIOD.	Ages under 25.	Between Ages 25 and 35.	Between Ages 35 and 45.	Between Ages 45 and 55.	Between Ages 55 and 65.	Between Ages 65 and 75.	Ages 75 and over.	All Ages.
1874-94	·45	1·57	5·56	14·95	43·13	120·11	173·28	21·27

In Bramwell's¹ excellent Summaries of the Mortality in the Scottish Union and National Insurance Company for the last four

¹ Bramwell, *Analysis of Deaths in the Scottish Union and National Insurance Company*, 1906, 1907, 1908, and 1909.

years the following figures occur :—The total number of deaths amounted to 1541, being in each year respectively 422, 398, 370, and 351 ; out of these, 424 may be regarded as due to Circulatory Disease, the following being the details :—

	1906	1907	1908	1909	Total.
Heart and Vessels,	52	67	79	46	244
Cerebral Hæmorrhage,	43	32	36	36	147
Embolism and Thrombosis	6	8	11	8	33
Total,	101	107	126	90	424

These figures, like those of Davidson and Muirhead, point to the extraordinary importance of circulatory affections as the cause of death.

GUIDES IN EXPECTATION.

A. Past History.

In forecasting the probable future of any individual, the family history must be taken into account. The great Oriental doctrine of Karma is not only applicable to the past events of our individual lives, but to those of our ancestors. Family tendencies, as is well known, pursue the different members belonging to such families throughout many generations ; and it is therefore absolutely essential, in estimating the prospects of any life, to discover whether some taint has been present in the ancestral history. This is more especially the case, as regards the circulation, when a liability to certain infections is manifested—infections which have a particular affinity for the circulatory apparatus. Amongst these may be cited—Rheumatic Fever, Scarlet Fever, and Pneumonic Fever. If several individuals belonging to a family have shown a liability to any one of these three, we may assume that there is weak resistance to infections involving a tendency to disorder of the cardio-vascular mechanism in that family. Rheumatism does not merely exercise a special influence over the pericardium and endocardium, but, especially in youth, it is the cause of myocardial changes, in consequence of invasion of the muscular walls by fibrous tissue. Scarlet fever produces similar effects, and it is therefore necessary to be more careful in estimating the state of matters in a patient who has suffered from this disease in youth than under ordinary circumstances. Even pneumonic fever (a

term which is to be preferred to pneumonia, seeing that the infection may invade the serous membranes instead of lung tissue) produces effects as well on the myocardium as on the pericardium and endocardium.

Amongst the few diseases which are still left to us as idiopathic or autochthonous is that condition which we are still fain to call gout. It is probable that no two physicians in using this phrase have exactly the same conception of its meaning; but we may take it that there is a general concensus of opinion that it denotes a condition of inadequacy of food assimilation and tissue change throughout the body—in a word, metabolic inactivity. This condition, in our own times, is not so likely to set up the acute articular effects from which our grandfathers suffered, as various degenerative changes, particularly affecting the blood-vessels. Chronic thickening and degeneration of the arteries throughout the whole body lead to alterations in the structure of important organs—the heart, the brain, and the kidney are particularly affected. Tracing out the hereditary tendencies of families, we are often struck by the almost tiresome iteration of such causes of death in generation after generation. In the interesting article on “Medical Aspects of Life Insurance,” Lyman Greene¹ refers to an instance “in which every member of a family died of apoplexy, heart disease, or nephritis, with the exception of one brother, whose history is unknown. Out of eight members, only two reached the fifties.” There are, as we all know, long-lived families and short-lived families. Amongst the latter, with the exception of the liability to tuberculosis, the hereditary tendency to early death is very commonly brought about through vascular degeneration, which seriously reduces the power of resistance to acute infections.

The occupation, the environment, and the habits, exercise an enormous influence over the state of the circulation, as the vascular degenerations are apt to be precipitated by anything which keeps the vessel walls in a condition of strain. Occupations which are attended by excessive exertion; environments involving unhealthy surroundings; and habits characterised by any kind of excess, are altogether evil in their influence.

Previous disease exercises a powerful effect upon the present condition of the individual. We have already seen that certain of these diseases ascertained in the ancestral histories of applicants play an important part in the evolution of diseased processes manifested in them. This is of necessity even more evident when the diseases have been suffered by the individuals themselves. More particularly is this the case when there is a history of rheumatism, chorea, or erythema in early years.

¹ *System of Medicine*, edited by Osler and M'Crae, vol. vi., 1909.

St. Vitus' dance and nodose erythema stand to rheumatism in the relation of effect to cause, and either of them, as well as rheumatic fever, may have produced definite cardiac effects which have been unsuspected. It therefore behoves us all who are concerned with the examination of applicants for assurance to inquire most thoroughly into the state of the circulation when such a history is revealed.

Of even greater importance is a personal history of arthritic troubles. Gout in its Protean aspects may leave its traces upon the joints, ligaments, or tendons; but, worse still, upon the heart, arteries, and even the veins. Thus it is that so many sudden deaths are brought about in middle life by angina pectoris, cardiac failure, cerebral hæmorrhage, and uraemic poisoning. Many other diseased tendencies influence the state of the circulation, but none to the same extent as those which have been particularly referred to.

It need hardly be mentioned in passing, that the history of any previous symptoms of circulatory disturbance should be fully investigated. Any account of a previous attack of breathlessness on exertion, or weakness with exercise, will be sufficient to arouse our suspicions regarding the integrity of the circulatory organs.

B. Present Condition.

We have, in the second place, to deal with the present condition of applicants who come before us. No one has yet defined what is meant by health, further than to say that the nearest approach to that ideal condition is a state in which there is perfection of function with integrity of structure. This, from the clinical point of view, is a somewhat cryptic utterance. Each of us probably forms his own conception of what a healthy appearance is, and is able, more or less, to distinguish divergencies from it. When we try to analyse more closely, however, the limits of what is called a healthy complexion, we realise how difficult it is to define them. We have, for example, a perfectly healthy pallor, and an undoubtedly unhealthy ruddiness. Pallor is frequently produced by nothing more than inherent denseness of the integument; while ruddiness may only be the result of acquired vascular distention. Whenever there is any doubt as to the validity of circulation in such cases, it is necessary to examine the blood by all our modern methods, so as to assure ourselves that, on the one hand, there is no anæmia, and, on the other, no cyanosis. The breathing of the applicant furnishes most important information. If the breathing is deep and quiet, the heart is, at any rate, maintaining the circulation through the lungs quite adequately; and quiet, regular breathing, along with an absence of any

duskiness of complexion, leads us to expect a healthy circulation. The condition of the subcutaneous tissues, particularly about the ankles, requires investigation, as the least degree of swelling in this region indicates inadequacy of the circulation.

We approach, in the second place, the condition of the blood-vessels. Something may be gathered from observation of the veins upon the face. When we notice that there is a dusky arborescence upon nose and cheek, we recognise that there has been habitual distention of the small veins of the skin. This is frequently tell-tale evidence of imprudent habits; but it would be unjust to assume that, in all such cases, alcohol has been the cause of the appearance. Exposure to varying climatic conditions will bring about a paralytic distention of these veins, and, in this way, lead to the arborescence. While scientific information and charitable consideration lead us to this conclusion, we must nevertheless remember that such appearances require careful investigation. The appearance of pulsation in the neck demands close scrutiny. There is a perfectly normal venous movement in the neck in absolute health; but there is also one which is of evil import, and would lead at once to declining any proposal. When any pulsation can be seen in the cervical veins, we must lay the applicant in the prone position and see whether the pulsation precedes the apex beat of the heart, or whether it follows it. Again, the arterial pulsation in the neck demands close attention. Under ordinary circumstances, the extent of the carotid pulse—as of the arterial pulse throughout the rest of the body—is not very obvious; but when we find the cervical arteries pulsating wildly, we know, even without further examination, that the most serious of all valvular lesions—aortic regurgitation—is present.

The condition of the peripheral arteries demands the most careful attention; the state of their walls, and the pressure exerted upon their contents, are subjects of much greater importance than any mere changes in the rate or the rhythm of the pulsation. It is a pleasure to find that, in the capital article by Lyman Greene,¹ this view is also strongly insisted upon. In all doubtful instances, it is not sufficient to feel one radial artery, but it is necessary, not merely to compare the arteries at the two wrists, but to feel as many of the peripheral arteries as are accessible. Hardness of the wall, sinuosity of the vessel, and atheromatous changes, indicate degenerative processes, and render the outlook a grave one. As a general principle, it may be expected that when such changes are present in any one artery, a tendency to similar alterations will be manifested elsewhere. This general principle, nevertheless, is subject to many reserva-

¹ *Op. cit.*

tions. At the post-mortem examination, for example, of a patient who has shown extreme changes in the accessible arteries during life, there may often be found practical integrity of the coronary arteries supplying the heart, and of the different divisions of the internal carotid distributed to the brain. On the other hand, with apparent integrity of the peripheral vessels there may be profound structural alterations in some of the internal arteries. Still, even with this reservation, we must hold that the state of the external arteries is to be accepted as an index to the condition of those supplying the viscera.

In most instances the arterial pressure may be approximately gauged by means of the educated fingers. There are many doubtful cases, however, in which the use of our modern instruments is imperatively demanded. Many an applicant, with some thickened arteries, may be suspected of a high arterial pressure; but when this is gauged by the sphygmomanometer, the pressure is found to be within normal limits. In all doubtful cases this instrument should be employed by examiners for life assurance. After nearly twenty years' experience with various forms of sphygmomanometer, its utility as an aid in diagnosis and prognosis has become, to my mind, a matter of paramount importance.

Turning to the rhythm of the pulsation, two main points must be emphasised. In the first place, moderate degrees of arrhythmia in youth must not be regarded as of too serious import. Most youthful cases of irregularity of the heart depend upon the influence of the nervous system. They are, in fact, usually produced by the interference of the vagus nerve. It is otherwise in middle age. When an individual who has, presumably, had a perfectly regular type of pulse previously, begins to show any of the various forms of arrhythmia, the cause is more likely to lie in some degenerative alteration of the nervous and muscular structures of the myocardium, interfering either with the production of the stimulus to contraction in the rhythmic centres of the auricles, or with its conduction thence to the driving parts, that is, the ventricles.

As regards the rate of pulsation, it may be said that any degree of frequency falling below 60, or rising above 85, is a matter to be seriously considered. Increased frequency is very often nothing more than an expression of nervousness, whereby the inhibitory influence of the vagus nerves is removed. But if, after the examination of the applicant has been finished, and he is allowed a few minutes wherein to sit quietly without disturbance, there should still remain a high rate of pulsation, it must be assumed that some cause for this, other than a transient nervousness, is present. Except in the few cases wherein tachycardia is a family peculiarity, its persistence denotes, at the

least, some irritation of the nervous system, or some toxic influence on the nervo-muscular structures of the heart. It is astonishingly common in those who have been guilty of different forms of excess, and, in them, it may be the only symptom which calls the attention of the examiner to what may be a serious condition of matters. In middle-aged people, persistent tachycardia is far from uncommon, and always spells a diminution of the span of life. Here it is usually the result of fibrous changes in the myocardium, whereby the nervous connections, as well as the muscular fibres, are kept in a state of irritation. Diminished frequency is likewise a matter of supreme importance. It is well known that, in certain individuals, and moreover in certain families, there is a tendency to a low rate of pulsation. The first Napoleon is commonly cited as an instance in point. In many examples the precise mechanism must remain in doubt, and a very diligent search into the case of Napoleon (as well as other instances of a similar kind) has not convinced me that we have the absolute facts. Persistent diminution of rate may be produced by nervous influence and toxic processes. Herein Nature sometimes plays strange pranks with the scientific observer, as the same influence may produce—in one case, an acceleration, and, in the other, a retardation of the pulse rate. Scores of times have examples of tachycardia, produced by tobacco, been under my observation. Occasionally, on the other hand, instances of diminution of rate, due to the same cause, have been under my care. Why the poison should, in one case, apparently diminish the action of the inhibitory nerves, and, in the other case, powerfully stimulate them, must at present be regarded as a mystery. When bradycardia is persistent it means, as a general rule, that there is some structural alteration, involving the nervous and muscular apparatus. Sometimes the entire heart participates in this, and the lesion may then be assumed to lie in those structures possessed of rhythmic stimulus production. In other cases, while the auricular part of the heart is beating with normal, or even increased rate, the ventricular only responds to some of the auricular pulsations: or there may, indeed, be complete dissociation. It need hardly be said that, in any case of this kind, no proposals for life assurance can possibly be accepted.

On examining the thoracic organs, the size of the heart, the force of the pulsation, the regularity of the impulse, and the character of the sounds, are the important points to bear in mind. Whenever the right border of the heart is more than an inch and a half, and the left border of the heart exceeds four inches from midsternum, it must be assumed to have undergone some dilatation; in other words, the cavities have become enlarged, while the walls

have also probably undergone some hypertrophy. The causes of such changes require most careful investigations. The force of the apex beat is necessarily dependent to a considerable degree upon the state of the chest wall, and if the condition of the subcutaneous tissues is characterised by the presence of too much adipose tissue, the heart, though practically normal, may not reveal itself by any apex beat. Again, in those who are abnormally thin, the pulsation may appear to be excessive. But, while keeping these cautions in mind, we may find that the force of the pulsation is decidedly below what experience teaches us to be normal limits; or, on the other hand, that it is considerably increased. The latter state of matters may be no more than the effect of nervousness, or tobacco, or alcohol; but, on the other hand, it may be the result of changes in the valves of the heart, in the peripheral vessels, or in the kidney, throwing a greater amount of work upon the left ventricle. Diminished force of pulsation is often due to transient weakness of the whole system; but it is also produced not infrequently by structural changes, such as fatty accumulation. As the myocardium is frequently weakened by previous disease, it is always necessary to make sure that nothing of the kind be present.

In turning to the results of auscultation, it may be said, by way of preface, that no remarks shall be made upon the phenomena revealed by this means in cases of pericardial mischief. The only instances of pericardial lesions likely to present themselves for examination for life assurance are instances of pericardial adhesions, shown by indrawing of the intercostal spaces around the apex beat, by a characteristic swelling of the veins of the neck during systole, and an abrupt emptying during diastole; as well as, in certain cases, a singular reduction of the size and rate of the peripheral pulsation during inspiration—the so-called *pulsus paradoxus*. Such a case as this might be brought forward for life assurance, but it is in the highest degree improbable that any of the other pericardial diseases, attended, say, by the friction produced by inflammation of the serous membrane, could ever come up. Adherent pericardium could never be accepted.

The cardiac sounds vary in their regularity and in their intensity, while they may also be doubled, or accompanied, or replaced by murmurs. The pulse has probably already revealed the existence of any irregularity, and nothing more need be said in this place upon the subject, except to emphasise the importance of seeing that each pulsation of the heart transmits an impulse as far as the radial vessels. This is specially emphasised as, in many cases, when the heart is irregular, a number of systoles may not be transmitted to the wrist. Such a phenomenon as this is a serious omen. An appreciation of the intensity of the cardiac

sounds can only come with long practice. Normally, the first sound is most intense at the apex, and the second sound at the base of the heart. We learn by experience the normal limits of these sounds, and we are able, with a considerable amount of accuracy, to note changes in them. Any accentuation of the second sound, produced at the aortic orifice, speaks of high arterial pressure and of possible renal changes; while a similar increase in the second sound, arising at the pulmonary orifice, arouses a suspicion of mitral disease, or of chronic pulmonary mischief. If the mitral first sound commences with a loud snap, it should always lead to the most careful examination, in case a mitral obstruction should be present.

The question of murmurs forms a thorny subject, inasmuch as some of these abnormal sounds have absolutely no pathological significance, while others are fraught with the gravest import. Numerous cases in doubt have been submitted to me, during the last twenty years, in which the existence of a murmur has evoked at least a grave suspicion, and has not infrequently led to the rejection of the candidate for entrance into one of the public services, or for acceptance by some Assurance Office. It cannot be too widely known that there are two kinds of murmur destitute of any grave import. In many cases, especially in youth, a murmur is produced, especially at the base, by changes in the position of the heart, due to the expansion and retraction of the lungs. If we find that the murmur in question disappears during any phase of respiration (and it usually does so at the end of a deep inspiration, to reappear again when the expiratory phase has taken place), we know that the murmur is not organic. Again, the cardio-pulmonary murmur, to which the French school of clinicians (amongst whom Potain¹ may be particularly mentioned) have directed special attention, occurs also with varying phases of respiration. It is a remarkably superficial type of sound, with a somewhat swishing character in it, and it, like the systolic murmur already referred to, varies with the respiratory phases. It is generally believed to be due to the movements of the heart, attracting or expelling some air into, or out of, the superficial part of the lung, in contiguity with the heart. When an organic murmur is detected, it means a definite lesion of one or other of the valves. In a large proportion of cases manifesting such organic murmurs, proposals are not acceptable; but the general rules governing our decisions in these matters may be reserved for the sequel.

We have already seen that the condition of the ankles must always be looked into, when there is any change in tint or any appearance of breathlessness. It is further necessary to examine

¹ Potain, *Clinique médicale de la Charité*, 1894.

the bases of the lungs posteriorly with scrupulous care. This is particularly the case in middle-aged people, where, in consequence of even slight impairment of cardiac adequacy, there is a tendency to hyperaemia of the lower portion of the lungs. The presence of any crepitations on auscultation, and still more, of even a slight degree of dullness on percussion, would always serve to insure the most careful consideration of the whole circulation.

Similarly, any increase in the size of the liver will evoke careful scrutiny, seeing that, whenever there is any tendency to failure on the part of the right side of the heart, the liver is one of the first internal organs to bear the brunt of changes in the venous pressure. There are usually abundant evidences to be obtained elsewhere of such failing cardiac power; but it sometimes happens that an enlarged liver and a slight accumulation of fluid in the abdomen, are the danger-signals leading to thorough investigation. The presence of albuminuria, with weakness of the cardiac impulse, and lessened intensity of the sounds, is similarly, an occasional harbinger of serious mischief; although, more commonly, it only makes its appearance when other and more obvious phenomena are already in existence.

GENERAL PRINCIPLES.

The final part of these observations must consist in an attempt to bring these scattered remarks to practical conclusions. In trying to fulfil this aim, you will undoubtedly extend considerable sympathy to me, as the real difficulties of the subject only begin at this point. The examination of the applicant in regard to all the varied local symptoms and physical signs which have been reviewed is a matter of comparative simplicity—one at least in which a certain amount of experience and an ordinary degree of care should produce absolute certainty. But, when we have effected a diagnosis, by determining in how far the applicant varies from what is accepted as the normal standard, the real difficulty only begins. In the case of grave lesions, such a difficulty does not exist. In spite of all that is said to the contrary—particularly in the works of some of our brethren on the western side of the Atlantic—Life Assurance is not to be regarded as a charitable institution but as a business venture. When an applicant, therefore, comes up for examination, who obviously fails to reach anything like an approximation to the normal standard, he must be rejected from a sense of duty to the present and future assured in the Institution. It is the instances near the borderland of health and disease which give us anxious thought in deciding what is to be done with them; and in this final section, this subject particularly must be kept before us. In

approaching it, we must take into consideration the nature of the disease—whether vascular, pericardial, valvular, or myocardial; the probable causes of the affection, especially whether of external or internal origin; the apparent extent of the lesion—whether involving a considerable area of the vessels, for example, or more than one of the valves; the effects of the disease—both direct and remote; the length of time which has elapsed since the first symptoms made their appearance; the age of the applicant—not merely as regards the present time, but with reference also to the period of life at which the disease first appeared; the sex—seeing that certain cardiac lesions are much more common in men than in women, and also much more serious in their effects; the environment—favourable surroundings always having a tendency to minimise the effects of any disease, and therefore to increase the chances of longevity, while unfavourable surroundings act in a precisely opposite direction; the occupation which is pursued—as all experience leads, as might be expected, to the conclusion that strenuous avocations involve more stress and strain than those which are light and easy; and lastly, the habits of the applicant—since a seriously damaged individual, living a careful life, may last longer than one only slightly affected, but whose daily walk and conversation stand in sad need of reformation.

When reflecting upon these different factors, there must always be the reservation that only very slight degrees of disease of the circulatory organs can be accepted on any terms. Seeing that the large mortality which has been insisted upon in the earlier part of this paper arises amongst the assured who have been accepted, almost without exception, as healthy lives, it behoves us to keep this guiding principle ever at the back of our minds.

Sir Andrew Clark¹ has called attention to what is the experience of every one of us—that many cases of valvular disease exist for many years without causing grave symptoms. He expresses the opinion that, if the general health and personal habits are satisfactory; if there is no alteration in the valvular lesion for three years, and if it is not due to degenerative, as opposed to inflammatory causes; if the heart muscle appears to be in good order, and the arteries are not degenerated; if no persistent pulmonary or hepatic congestion is present; mitral disease will not shorten life, and a case of mitral regurgitation may be accepted without any very considerable extra.

Davidson² points out that when we consider what a large percentage of the assured die of heart disease before their time, although the circulation in their case was apparently healthy at the time of assurance, it is probable that those with hearts already damaged would, if accepted, show a much greater mor-

¹ *Loc. cit.*

² *Op. cit.*, p. 18.

tality. It cannot be doubted that they are much more likely to die of pneumonia and other febrile disturbances, which so often lead to premature death.

Two discussions have taken place within recent years which are of the greatest importance as regards the question of disturbances of the circulation in their bearing upon life assurance. One of these was the discussion upon the Influence of Heart Disease on Life Assurance, held by the Life Assurance Medical Officers' Association in 1898; and the other was the discussion on the Prognosis of Cardiac Disease, in respect of Life Assurance, held in Edinburgh, at the Annual Meeting of the British Medical Association, in the same year. The remarks of several of those who took part in the discussion are referred to in this present paper; but, in this place, it may be advisable to give the opinions of Theodore Williams,¹ who led the debate at the former discussion:—

“In considering the question of acceptance or rejection of applicants affected with heart disease, due regard must be had to the following points:—

“1. *Age*, both present and at time of attack. Cardiac lesions that appear at 20 are more likely to improve than those coming on after 40, and the greater the age of a candidate, the less probability there is of complete compensation.

“2. *Sex*. Women are less liable to aortic valvular disease than men. Men are less subject to mitral valvular disease.

“3. *Occupation and Surroundings*. Whether these are the same as those under which the cardiac disease was contracted, and whether they are likely to be temporary or permanent.

“4. *Habits*, such as the presence or absence of alcoholism, excess of tobacco-smoking, or the use of certain drugs.

“5. *Origin* of the cardiac disease, whether in endo- or pericarditis, or as the result of degenerative processes.

“6. *The Nature* of the lesion, and especially whether it be progressive or stationary.

“7. *The Amount of Compensation* established to overcome the difficulties of the circulation.

“Careful study of the histories of persons affected by the various heart lesions has shown that a longer life is compatible with the existence of many of them than was formerly held; yet, in the absence of large records, it is impossible to reduce the probabilities in all cases to definite figures, and the subjoined conclusions can only be regarded as approximations to assist the medical examiner in his work, which must, after all, be directed

¹ Theodore Williams, *Trans. Life Assurance Medical Officers' Association*, 1898-9.

to the circumstances of the candidate under examination and to his surroundings and outlook.

"1. *Cases of adherent pericardium*, provided there are no valvular lesions, that the muscular walls are sound, and that there is no cardiac dilatation, also that the adhesions are not to the chest wall itself, may be accepted with a moderate addition of from three to five years.

"2. *Mitral regurgitation* cases, where the origin is not degenerative and the compensation good, and where there are no dyspnoea and complications, can be accepted with an addition of from five to ten years, according to the age of the candidate.

"3. *Cases of mitral stenosis* are less favourable, being liable to cerebral embolism, and can only be accepted if the disease be not progressive, if there be no accentuation of the second sound, no enlargement of the right side from either dilatation or hypertrophy, and no dyspnoea. They can then be accepted on less favourable terms than cases of mitral regurgitation.

"Double mitral lesions, however, can only be considered with very large additions.

"4. *Aortic valvular disease*, whether regurgitant or obstructive, cannot as a rule be admitted into the category of assurable lives; though favourable instances, where the lesions originate in rheumatic endocarditis, and the compensation is complete, have been occasionally accepted with large extras.

"5. *Cases of cardiac dilatation*, without compensation, cannot as a rule be accepted at all, except when the dilatation is of a temporary nature, such as may follow over-exertion and over-smoking, but even here the case cannot be considered until all dilatation has subsided.

"6. *Cases of cardiac hypertrophy* must be estimated with reference to the modes of causation, and no definite rule can be laid down, though lives where the lesion giving rise to the hypertrophy is not progressive, the muscular wall in a sound condition, the compensation complete and the vessels healthy, may be regarded as within the pale of life assurance, as, for instance, athletes who have given up sports, and women whose cardiac hypertrophy originated in frequent pregnancies, but are now past child-bearing. Here the lives may be accepted with an extra, varying with the age.

"7. *All forms of degeneration of the cardiac walls*, fibroid and fatty, must be excluded, and vigilant watch kept against their admission.

"8. All forms of *cardiac neurosis* are not equally dangerous, but they are too uncertain in their clinical life-history to allow of being admitted among the assured.

"A system of endowment, making entire payments before a

certain age, would probably protect Assurance Offices and preclude the necessity of large extras."

Sir Douglas Powell¹ has clearly defined the principles which guide him in estimating cases of heart disease for assurance:—

"The first principle of safety in assuring all cases of decided valvular defect is to reckon off a number of years from the life corresponding with the natural period of degeneration, that is, the period when the reserve powers of muscular repair over waste have become a diminishing quantity. The last twelve or fifteen years could thus be withdrawn from the normal term of such lives, making them for an applicant aged 30 terminable at 56. The next point is to consider, on the merits of each case, whether the heart will hold good up to this period of degeneration, when we might naturally expect its compensatory powers to begin to fail. Then further contingencies in the way of overstrain, fresh rheumatism, ulcerative complications, and any intercurrent acute disease in other organs may arise and may be dealt with."

In a short section of the article on Life Assurance by Symes-Thompson,² the references to heart disease are extremely short:—

"The diagnosis and prognosis of cardiac disorders are fully discussed elsewhere; I can only say here that cases in which indications of muscular failure exist are uninsurable. Where compensatory hypertrophy conceals all evidence of circulatory defect the case may be considered, and acceptance advised on condition that all premiums be paid before degenerative changes are likely to occur. Aortic disease is more perilous than mitral. Cases of mitral stenosis and aortic regurgitation can but seldom be accepted. Less, however, depends on the situation and character of the murmur than on the history and constitutional state.

"Irregular action, with feebleness of impulse and confused rhythm, is of evil portent.

"Intermission of the pulse and apex beat may not prove the existence of serious defects, but calls for close investigation, and often leads to the discovery of gouty, dyspeptic, or nervous disorder.

"The rapid, nervous, palpitating 'insurance heart,' so constantly observed among candidates for life assurance, requires skill and experience for its estimation. The beat is so rapid, tumultuous, bouncing, and diffused, that it suggests the idea of serious disease, and may indeed mask organic defect. Its variability and manifest association with general nervous perturbation, will generally enable the physician to assess its import at the first interview; if not, a second should be arranged. Some pro-

¹ *Trans. Life Assurance Medical Officers' Association*, 1896-7.

² *System of Medicine*, Allbutt and Rolleston, vol. i., 1905.

posers faint when thus examined, and may justly be regarded as too unstable to be accepted as first-class lives. These are persons who are morbidly sensitive to a refusal or an extra rating, and it is important, by firmness and kindness of manner, to give them confidence and self-reliance. A medical referee cannot be too careful to avoid causing distress or anxiety in an applicant, even if he be obliged to decline the proposal."

When we have to deal with what may be called the simple nervous affections of the circulation, we do not require to take any grave view. Many instances of vascular crises, leading to great personal discomfort, but not involving any serious risk, so long as there is structural integrity of heart and arteries, need not give us any apprehension. Such attacks are sometimes produced purely through the agency of an impressionable nervous system; at other times, by means of impurity in the blood, due to faulty digestion, assimilation, or excretion. Similarly, attacks of palpitation and other cardiac disturbances may be induced through the influence (direct or remote) of the digestive system, or of some poison generated within the body; while, in many individuals, a little nervous disturbance may quite well induce such attacks. In the same way, paroxysms of arhythmia may be of purely accidental origin; but we are here approaching more serious conditions, and such symptoms demand more rigid scrutiny.

When the arteries are thicker than they should be for the age of the individual, and especially if they show sinuosity, or tortuosity, it is most necessary to study the arterial pressure with the greatest care, and to investigate the effects of the arterial changes upon the size and sounds of the heart. There cannot be a doubt that, when arterial degeneration is present, there is an increased tendency to the vascular crises already mentioned, and such vascular crises, occurring in the presence of damaged heart and vessels, may precipitate a fatal issue. Any symptoms of pain in the areas usually attacked by the paroxysms of angina pectoris must lead to delay in accepting a proposal; while the least threatened implication of the renal functions will, similarly, lead at least to postponement. If there should appear to be any throbbing of the cranial arteries, attended by giddiness or headache, again it will be impossible to accept the applicant. In every instance of arterial change, it is necessary to look out for syphilitic appearances. In dealing with the vessels, the question of aneurysm necessarily arises, and it need simply be stated, tersely and definitely, that no applicant who has an aneurysm arising from any artery can be accepted.

Leaving the arteries, let me say in passing, that as a general rule, a slight tendency to varicose veins need not lead to any anxiety; but that, if there be an extensive development of this

condition, there are too many risks, from thrombosis and embolism, to lead to acceptance.

Lesions of the pericardium need not delay us long, as adherent pericardium alone is likely ever to come up for examination. This condition necessarily leads to great disturbance, from hindering the action of the heart and involving hypertrophy to compensate for the lesion. If any of the appearances already described should be present, the case should at once be definitely declined.

The only lesions of the endocardium which require our attention, are the different valvular affections. Some of the difficulties in regard to the separation of these lesions from slight disturbances giving rise, for example, to the adventitious murmurs produced by changes in the position of the heart and of the lungs, as well as to the murmur of anæmia, have already been fully discussed, and it need only be said, in the case of the two former, an application may at once be accepted; while, in the third mentioned, the life may be assured as soon as the anæmic condition has been remedied.

As regards the valvular lesions properly so-called, we now well know their relative seriousness. Generally speaking, aortic lesions are much more serious than mitral lesions: while affections of the cusps of the right side of the heart are, with one exception, so rare that they need hardly demand our consideration. Aortic obstruction, as an isolated lesion, is much more common than aortic incompetence in itself. But both lesions are very much more frequently met with combined in the same individual. When aortic obstruction, however, does occur, it is usually in elderly people, as the result of chronic degenerative changes in the aortic cusps and in the walls of the aorta. It is not, in itself, a very serious lesion, but inasmuch as it is apt to be linked with vascular degeneration throughout a wide area of the circulation, it, if accepted at all, can only be so for limited periods and with considerable extras.

Aortic incompetence can never be accepted on any terms. The extreme fluctuations in arterial pressure which it produces, and the tremendous effects which follow it as regards cardiac dilatation and hypertrophy, render life precarious in the highest degree, and make the risk too great for acceptance. And yet, even here, examples rise before my mind in which, contrary to all expectation, patients suffering from the gravest forms of aortic disease have, under my observation, gone through even the hard work of the medical profession for a quarter of a century, and seem now as well as when the lesion was first detected. As regards mitral disease, we have once again to consider that mitral obstruction and mitral regurgitation are more commonly found combined than

single. A slight degree of mitral obstruction in a young man, showing itself by a well-marked pre-systolic thrill and murmur, with a steady, regular pulse; with but little cardiac hypertrophy and no cyanosis or oedema, may certainly be accepted, but with a fair amount of addition to the ordinary rates. Practically the same statement may be made as regards mitral regurgitation. Mitral obstruction, however, is usually the effect of acute rheumatism in early life, while mitral regurgitation is not infrequently the result of degenerative changes, or of loss of tone in the cardiac muscle. Before any conclusion can be reached, the probable cause must be determined, and then the general principles, as regards the presence or absence of the resulting symptoms, must be applied to the case. When obstruction and regurgitation are combined in the same individual, there is not in that fact alone any great departure from what has already been said as regards either of these lesions in itself. If there be an absence of serious disturbance of the circulation, and if the proposer is youthful, the risk may be accepted for a limited period, with a considerable extra.

Lesions of the pulmonary valves are almost invariably congenital in their origin, and they but rarely exist long enough to present themselves for assurance. In these days, however, of Child Assurance, it is probable that such conditions may more frequently come up for consideration, and it need only be said here that lesions of the pulmonary orifice are not on any terms acceptable.

Tricuspid lesions used to be regarded as the rarest of all valvular diseases; but we now know that, while this statement is true as regards obstruction, tricuspid incompetence is one of the commonest. It arises in a great many cases of slight weakness of the muscular walls of the heart, and is of no significance whatever so long as it is slight in degree. It is otherwise with tricuspid obstruction, which, if diagnosed, should lead at once to rejection. If regurgitation leads to serious venous pulsation in the neck, enlargement of the liver, ascites, or albuminuria, necessarily the case must be rejected. In slighter degrees, the lesion must be assessed according to the facts which are present.

Turning, in the last place, to the myocardium, we find ourselves in the presence of conditions which are of much more real importance than any which we have hitherto considered; unfortunately, however, the difficulty of ascertaining the exact state of the muscular wall of the heart is greater than any other which meets us in attempting to estimate the state of the circulatory organs. We can, with great accuracy, determine the size of the heart—both by the older clinical methods and by the modern applications of electricity. We can, to some extent, estimate its power by the

force of its impulse and by its result in arterial pressure. Attempts have been made by myself and others to gauge its energy by means of measuring the electro-motive force produced by its contraction. Even when we have determined, with as much accuracy as possible, the energy which it produces, we are unable to do more than infer that it is probably healthy, or diseased; while we are frequently quite unable even to estimate whether the strength of the heart is only just equal to the amount of resistance which it has to overcome. In many of those approaching middle-age, the field of response exhibited by the heart muscle is scarcely adequate, and the least extra stress brings about a little blueness of complexion, a little breathlessness on exertion, a little swelling of the ankles at nights, or a slight change in the amount and contents of the renal secretion. The history of any symptoms of this kind shows inadequacy of the heart muscle. Needless to say that if, from the state of the vessels, the condition of pressure, the size and sounds of the heart, and any evidences of renal changes, we conclude that interstitial myocarditis is present, the applicant manifesting such symptoms should be declined at once. If, in consequence of general obesity and cardiac inadequacy, we conclude that some fatty accumulation has taken place, we should likewise eschew any dealings with the applicant. Fatty degeneration is never likely to cross our path in assurance work, as it is almost invariably the result of such grave blood changes as we find in pernicious anæmia, both forms of leukæmia, and toxic conditions; in none of which would an application for assurance ever be dreamed of. We have already seen that in many other circulatory disorders the heart is affected by dilatation, or by hypertrophy, or by both processes, and it need only be reiterated here that if there is any considerable degree of either of these processes, the case must be regarded as inadmissible.

It may be asked, Why should hypertrophy, which is a compensating process, be judged so severely? The reason is not far to seek, and a little reflection will make the matter clear. The nutritive possibilities of the heart depend on the adequacy of the blood supply, and this can only be maintained when the coronary arteries bear their proper relation to the bulk of the heart. If the walls of the heart outgrow the capacity of the nutrient arteries, the blood supply must fail, and the heart will inevitably suffer.

Now, in all that has been brought forward, it is obvious that this attempt to reach general principles is founded more on isolated instances than collected statistics. Why is this? It is simply for the reason that statistics of any real value, in this connection, do not exist. The words of the late Sir William

Gairdner,¹ addressed to the Section of Medicine in Relation to Life Assurance of the British Medical Association (which has been already referred to), bear this out most completely:—

“I am afraid we have got no very accurate data to proceed upon in these cases, and I do not expect to be able to offer such to you to-day, not at all anything like statistical detail, not anything like the basis of a reasonable calculation derived from numbers. We have not got it simply because the material does not exist. We know of isolated cases, but we do not know of numbers or of large groups of cases. Under these circumstances we have only two ways of dealing with the matter when an extra risk comes in view in connection with disease of the heart: we either shut down the door and refuse to receive the life, a very painful thing to do when the proposal comes from a man who believes himself to be in perfect health, and has never had reason to suspect himself, and who applies with the full confidence that he is going to get insured at the ordinary rates, or that he has a life even above the average; and still more painful is it if you are obliged to give your reason, obliged to tell this man who has come to you in the full enjoyment of perfect health, that he has got heart disease. It sends him away home to moon and worry over it, and very likely to kill himself with anxiety. The other alternative is to be a little blind, to overlook the facts, to explain them away to your own conscience, to temporise, to put it upon some other issue, to say ‘We are not justified in dealing with you to-day; wait a little’; to put off the evil day, as it were, in the hope that something will turn up, and that you will be able to admit the man at an advanced premium. These are the alternatives.”

The aim which Sir William Gairdner had clearly before him was to ascertain whether any better system of estimating the expectation of life in cardiac cases could be devised, or, in his own words:—

“The object of this present paper is to see whether any kind of *via media* can be got; whether any data can be procured—not to-day, for I do not think that we shall arrive at it to-day—but whether any data can be procured that will enable our successors to deal with cases of extra risk in life assurance on better principles than we can now.”

The conclusion of the whole matter seems to me to lie in the conception that, for the present at least, we have no better guide in the selection for assurance of proposers suspected of some circulatory disorder than the ordinary methods of diagnosis and

¹ Gairdner, *Brit. Med. Jour.*, 1898, vol. ii.

prognosis employed in practical medicine. After all, the decision in each case must be a matter of trained common-sense.

You will allow me in bringing these scattered remarks to a conclusion, to express my grateful acknowledgments to the President and the Council, as well as to the Fellows of the Faculty, for giving me this opportunity of meeting you upon a matter of so much importance.

DISCUSSION.

MR. ORR.—I should like to congratulate you on having induced Dr. Gibson to come before us and give us a paper on such an eminently important subject. Many of us here, but not perhaps all, are aware of the great demands made upon Dr. Gibson for his professional services throughout the length and breadth of the country, and we feel that his presence here shows that he takes no ordinary interest in the problems connected with Life Assurance from the medical and the actuarial points of view.

When our Secretary asked me to take an opening part in the discussion, I said, on learning that the paper was on Heart Disease, that it was presumption for any layman to pass anything of the nature of a criticism upon what such an authority might say; but as Dr. Gibson is a very old friend of mine, it is a special pleasure to contribute anything towards a discussion, and I feel sure that he would be vastly disappointed if we did not respond to his goodness by in turn indicating the opinions which we, as insurance men, hold on such subjects.

Personally, I would prefer to speak on the matter less from the actuarial point of view and more from the general insurance point of view, leaving to others to elaborate any views they may have of a strictly actuarial kind. No doubt it will be pointed out that the practical conclusions to be drawn from the various records of deaths, such as Dr. Gibson has quoted, would be much more valuable if we knew the number of lives exposed to risk, and could judge of the relative rate of mortality. As furnished by medical officers, such figures naturally and properly deal with various descriptions of deaths; but from the insurance point of view such records are really more suggestive than conclusive. It must always be so when the medical officer works apart from the actuary, and indeed it is only in the combination of the two that satisfactory results can be obtained. Those of us who have read from time to time the interesting Transactions of the Life Assurance Medical Officers' Association have been struck with this, and have noticed the tendency of the contributors to its debates to dwell at length on interesting, though perhaps isolated, experiences which they have had.

The actual data in regard to heart disease which are recorded in a

manner satisfactory to both the medical profession and the insurance profession, are distinctly limited ; indeed, one finds it very difficult to know where to turn for actual figures upon which reliability may be placed.

I think it might not be uninteresting to Dr. Gibson if I quoted figures which have been calculated from the Experience of the American Life Offices, which was published a few years ago. One set relates to cases where the pulse was intermittent or irregular, and the other to cases where the pulse rate was below 60. In the first set, that of intermittent or irregular pulse, the number of entrants was 3985 ; the number of deaths was 240 ; the rate of mortality for those who entered between ages 15 to 28 (1236 lives), turned out to be 24·4 per cent. below the expectation ; at ages 29 to 42 (1992 lives), it was 26·6 below ; at 43 to 56 (665 lives), 17·4 above ; and at 57 to 70 (92 lives), 11·1 below : for the whole of the entrants together, from ages 15 to 70, the rate of mortality was 12·3 per cent. below the expectation. Turning now to those cases where the pulse rate was below 60, the number of entrants was 11,949 ; the number of deaths was 436 ; for entrants at ages 15 to 28 (3875 lives), the mortality experienced was 37·3 per cent. below the expectation ; at 29 to 42 (5903 lives), 31·5 below ; at 43 to 56 (1944 lives), 24·9 below ; at 57 to 70 (227 lives), 23·1 below : and for the whole series of lives, ranging from 15 to 70, the rate was 29·9 per cent. below expectation.

I do not know whether it is to the point or not, but I may add that the same Experience deals with cases of inflammatory rheumatism. Over 56,000 entrants had had one attack, and showed, over all, a mortality of 3 per cent. under expectation. Nearly 7000 had had more than one attack, and showed a mortality of about 8 per cent. above expectation.

Dr. Theodore Williams, in his address to the Medical Officers' Association, gave a table of the Experience of the English and Scottish Law Life Office, 1863-1893, which he stated had been prepared by Mr. G. F. Hardy. That table brought out the average age at death of those who died of heart disease as being several years higher than the average age of those who died of all other diseases. He made a great point of this, stating that the "deduction from this would seem to be that among selected lives heart disease rather tends to prolong than to curtail the duration of life." But one would like to know if Mr. Hardy agreed with the conclusions drawn from the table. Heart disease in cases passed for life assurance, and especially those passed at ordinary rates, may be regarded as largely a disease which will cause death in the later and not in the earlier years of life. Consequently the age attained at death might be expected to compare favourably. I think this is one of those cases where a closer union of the actuary and the medical officer might have led to somewhat different conclusions.

In the same interesting address the opinion of Sir William Broadbent is quoted to the effect : "If you want a man to live, he had better have mild mitral regurgitant disease. There is no limit to his age, because he will take care of himself." While one quotes this remark with interest, it would be well to add a distinct qualification from the insurance point of view, that to place such a theory before a hard-headed Board of Directors might not be calculated to increase their confidence in their chief officials.

Turning now to some matters of practical application, I would like to say that the experience of my own Office in regard to heart cases has been favourable. They have, of course, been limited in number, many having been declined as too hazardous. It has been our practice in most cases to stipulate that the assurance should take the form of an endowment assurance, and should not extend beyond age 55 ; and the extra premiums which have been charged have varied from about 10s. to 20s. per cent.

Up to the present I think I am quite justified in stating that these cases have proved satisfactory to the Company.

One effect of this paper has been the decided strengthening of one's opinion that in all cases of such disease, real or suspected, it is most essential that the proposer should appear before a specialist in such disorders, or at least before one of the company's experienced medical examiners. If the applicant resides in or near a large city this is easily arranged. The necessity of this is great, because we must admit that cases of disease of this kind can only be dealt with on the advice of the company's most skilled medical officers. Many of us may have views in regard to various other cases, such as those which present a phthisical family history, and may rightly or wrongly consider our own opinion to be one that should be weighed in the balance when judgment is being given; but it is entirely different in cases of heart trouble. One has only to read the paper before us this afternoon to realise how absolutely hopeless it is for any non-medical man to give an opinion of value in regard to a heart case. Nor are we officials always too well served by the medical officers we are obliged to employ throughout different parts of the country. On the one side we have men of the eminence of Dr. Gibson, from whom nothing but satisfaction is to be expected; but on the other hand we have such men as a Hibernian medical officer in a remote part of the country, who evidently possessed sufficient second sight, and certainly astuteness, to be able to fill up and complete a medical report form—signature and all—on the life of a man that he had not examined!

Might I be allowed to suggest to Dr. Gibson that, as he has taken so much trouble with his paper, he might take even a little more, and out of the fulness of his knowledge append to his paper a schedule of questions that might be specially put for answer by the medical examiner in each case of heart disease? Most of us have Heart Schedules, but all such forms require revision at times. Would Dr. Gibson advise that to such a schedule there should be added an anatomical chart in which the direction of transmission of the murmur could be traced and submitted to the principal medical officer of the company? In connection with any such schedule, I presume that he would advise that the blood pressure should be recorded. I think that the attention of all who have to do with the decision on proposals should be directed to this matter of blood pressure. While these instruments have been employed for many years by experts, they are not in general use by the average practitioner, and I think it would be a matter of interest to us if, when Dr. Gibson is good enough to make a few remarks at the close of the discussion, he would be kind enough to give us a word or two on this subject. I understand that the medical faculty are not quite agreed in regard to the lessons to be drawn from such instruments, but it would be very interesting to have Dr. Gibson's remarks upon them.

I would like in conclusion to say some words on a subject allied to this paper which has lain on my mind for a very long time past. No one can engage in the practical work of a life office without realising week by week that there are many questions calling loudly for solution, many questions to which it is difficult to get an answer. We have before us to-day one of these, namely, what should be the attitude of a life office to various cases of heart disease? There are many other such questions in connection with other diseases, and we are largely in the dark as to the way in which they ought to be treated. I would venture to ask if the Faculty is doing its duty in regard to such matters. I do not think that it is. We have a Royal Charter; we are the custodians of actuarial science in Scotland; and along with the sister body of the Institute of Actuaries we occupy such a position in the

world of insurance and the world of science that we must recognise that it is to the actuaries of Great Britain that the British public, home and colonial, looks for a solution of these various problems and for guidance in all such matters. We have lying in the archives of our various offices papers, to be counted by tens of thousands, which contain invaluable information, and which are only waiting the combined scrutiny of the actuary and the medical officer to give the answer to the questions of the day. I would strongly advocate for the consideration of the Faculty the question whether the time has not come when they should establish a bureau—of a permanent nature—to deal with the questions which must come up from time to time, and which can only be solved by joint research among the records of the various life offices. In Edinburgh we are peculiarly well situated for such an enterprise: we have the Faculty of Actuaries, under whose auspices it could be worked; we have a body of men composed of the chief medical officers of the various companies, who, I am sure, would be only too willing to give their best services and advice; and we have most of the members of the Associated Scottish Life Offices. In the great matter of means, I feel confident that we would only have to show the directors of our life offices that such a bureau would yield valuable results and advance the cause of life assurance to find that their generosity would not be lacking. A most efficient bureau could be established if the matter were taken up by our leading men; and the cost of it, spread over the different companies, would be small. This is a subject which I think might well be discussed at some future time, and I might wish to take the opportunity of placing it before you on another occasion.

In the meantime, and until some such outcome as this takes place, blending the knowledge of the actuary and the medical officer, we must most heartily welcome to our Hall those eminent members of the medical profession, like Dr. Gibson, who come, alas! too rarely, but who, when they do come, give us of their best.

Mr. STENHOUSE.—An actuary is supposed to know something about medical matters. At the same time, it would be an impertinence for any ordinary actuary like myself to attempt to criticise a paper such as that submitted by Dr. Gibson, for much of it is written in what is to me practically a foreign language. The position that I am in is very much the same as if we asked him to make some remarks on the methods of graduating a Mortality Table, or the effect of an $OMOM^{(5)}$ Valuation.

Although I am not able to criticise the paper, I must say I read it with interest, and realised something of the care and thoroughness with which Dr. Gibson must view the cases which come before him for consideration. As he refers to Dr. Muirhead's "Causes of Death among the Assured in the Scottish Widows' Fund," it may be of a little interest to this meeting to know the ages at death, in various periods, of those who died from heart disease. They were:—

In the period from 1860 to 1866	61·111 Years.
" " 1867 to 1873	61·540 "
" " 1874 to 1880	62·266 "
" " 1881 to 1887	63·543 "
" " 1888 to 1894	64·186 "
" " 1895 to 1901	64·130 "

These, it will be understood, are only the cases in which the cause of death, included by the Doctor in his statistics, is given definitely as heart disease. In every case the age is appreciably higher than the average mean age at death from all causes, which supports what Mr. Orr has said. The gradual

increase in the age at death is probably accounted for by the increasing age of the Office, and the closeness of the last two ages by the fact that the business by that time was becoming perfectly steady, or to put it another way, the lives under observation were reaching a stable condition.

The question of heredity is, I believe, a vexed one, and one on which doctors disagree. I gather from his remark on p. 231 that Dr. Gibson is a believer in heredity, and keeping this in view, he sounds, a little farther on in the paper (p. 246) a warning note in regard to Child Assurance. I presume Deferred Assurances for Children are meant. There is probably a good deal in the warning, for when competition for business is so keen that offices not only offer very liberal options, but are inclined to relax their requirements and simplify their proposal forms, they should take care that they obtain all the information needed to enable them to judge fairly of the prospects of the longevity of the child. Probably not many of the children to whom Dr. Gibson refers would ever live long enough to put an office on the assurance risk, but a few might reach manhood's estate, and if they did so they would certainly be bad risks. To many boys a touch of rheumatism or rheumatic fever is by no means uncommon, and these boys also may reach manhood, and if they do so will also come on the office books, probably with crippled hearts.

In the paper stress is laid on the influence which occupation, environment, and habits have on the state of the circulation. In regard to environment, the word is, I think, capable of a much wider meaning than that usually attributed to it: and we see it in one way in connection with business. The keenness of business and the strenuous struggle for existence make life a constant fight, and unfortunately, through temperament, some people make it even worse than it need be. One man has quick appreciation, clear conception, prompt decision, and ready expression. To such a man it is no great effort to get through a day's work; but to certain men there is a mental environment which is most unfortunate. They are not lacking in brain power, but along with the grey matter in the brain there is the microbe of indecision. As you are all aware, microbes increase at an enormous speed, and if a person is unable to make up his mind speedily, there is necessarily more tear and wear on both the brain and the heart, for the heart is bound to send the blood to the brain to irrigate it till the matter over which he is thinking is disposed of. In short, the one man works; the other worries. Now if both of these men undergo medical examination, I don't suppose the doctor could estimate how much quicker the second man is using up his reserve strength than the first.

Another form of environment which I think has a serious effect nowadays is associated with our pastimes, and the present neurotic mode of life often requires a big tax from the heart. Within recent years one can recall the chairman of an important function collapsing through heart failure; various cases have happened in which the excitement of a football match proved too much for a spectator; a young lady has dropped down at a dance and never recovered; a man after a good dinner and a night at bridge has been found dead; and another after an amusing play has suddenly expired. All these are things in which there is more than the usual excitement, and where undue strain is thrown on the heart. I suppose we have all felt a touch of tachycardia in looking at an exciting football match. Such consequences are almost unknown when the method of passing the time takes a less trying form, as in reading, visiting a picture gallery, or attending a concert.

Then turning to footballers, athletes generally, mountaineers, and motorists. Again I could cite cases in which excitement has led to premature death. It is quite a common thing, as mentioned in the paper,

for people under medical examination, through pure nervousness, to have considerable palpitation. If, then, there is this tax on the heart over such a simple matter, how much greater must the strain be in some of the pursuits mentioned; and my contention is that, while we get a most careful report from a doctor, there may be factors of which he knows nothing that are far more important than the medical examination.

I might just refer for a moment to Dr. Gibson's remarks on "heart murmurs" and a case of which I knew many years ago. A friend, who was a football player, had submitted himself for medical examination in connection with assurance, and was delayed on account of a heart murmur. The real fact was that, unknown to himself, he had had his ribs compressed in a "maul," and when breathing there was a sound heard which was taken for a heart murmur. Naturally alarmed by the report, he consulted his own doctor, who soon saw what was wrong, and in a few months he was all right.

Referring to the statements regarding the rate of pulsation, I presume you are all aware that "soldiers' heart" leads to a great number of experiments being made. Lieut.-Col. H. E. Deane had an interesting paper in the *Journal of the Royal Army Medical Corps* in June last, in which he shows the effect of exercise on trained and untrained people—soldiers, dancers male and female—from which it is seen that sometimes the pulse will run up to considerably over 200, and that it comes steadily back to the normal, the normal state being reached quicker in trained people.

I mention this, however, to introduce one or two of the remarks made by Dr. M'Kenzie, who is, I understand, a recognised heart authority. He says: "I recognise the importance of Colonel Deane's observations, for as yet we have no reliable standard by which to measure the heart's efficiency. Many observers have sought to find a standard of inefficiency in a certain acceleration of the heart's rate after exertion, but the results given show that the inferences drawn from the rapid heart action after exercise are not nearly so simple as had been thought. It cannot be too strongly insisted upon that what are often looked upon as abnormalities, such as increased rate, diminished rate, irregularity, murmurs, are not necessarily signs of disease. . . ."

In the current month's issue of the same journal, Dr. M. S. Pembrey has an article called "Observations upon Disordered Action of the Heart," so-called "soldiers' heart," from which I may read two extracts. "The rate of the heart beat varies greatly in different subjects, even when they are healthy and, as far as possible, under similar conditions. There is no rate which can be given truly as the normal."

"The range of the pulse rate in different healthy young men at rest is from 45 to 90, and there is no evidence that even this extensive range is a rigid one. Dr. Michell has examined a large number of undergraduates at Cambridge, including 1200 rowing men, 410 football players, and a few running men; he found for the average rates of the pulse the following values:—In first year of residence, 69; second year, 64.5; and third year, 56.8. The rate in some was as low as 46. . . ." And farther on he says: "The slow pulse is generally found in the men who are physically the fittest subjects, and under the influence of progressive training the frequency of the pulse at rest is reduced."

When he comes to the heading of general principles, one appreciates the immense amount of trouble the author must have taken over the paper, and his quotations from the remarks of former writers upon the subject are most interesting.

With reference to Dr. Theodore Williams' recommendations regarding cases of adherent pericardium where a small addition only is suggested,

personally I am inclined to think that very small additions, from a commercial point of view, are not advisable. They cause more irritation than they are worth, and any proposer who has very little wrong, and is rated up by an office, is annoyed at being treated as a damaged life, and will always have a grudge against that office. Possibly the idea that he is advising an office for a business purpose makes a doctor suggest an extra merely as a precautionary measure. To a private patient he would probably say just to take things quietly for a bit. Dr. Henry Handford, in a paper he read some years ago to the Nottingham Insurance Institute on "Heart Diseases in their Relation to Life Assurance," said: "There are many slight differences and abnormalities which must be accepted as coming within the average standard of health." This is a matter of experience which the doctor only can decide.

I suppose Dr. Williams' suggestion, referred to in the paper, to grant endowment assurances as a protection to offices, and an obviation of the necessity of high extras, is now pretty usually adopted. Very much the same idea is that mentioned and put forward by Sir Douglas Powell when he suggests that in cases of decided valvular defect a number of years should be eliminated from the normal term of such lives. If I had to deal with an under-average life I would impose a substantial extra, or accept it at the ordinary rate as an endowment assurance, the shorter the period the proposer will agree to the better.

I fear there are many points which would be worthy of consideration in dealing with the assurability of a life which we do not know and which often we cannot obtain. A proposal is submitted to us: What is the man?—a proposal form. What is his environment?—two private friends' reports. What is his appearance, physique, and state of health?—the doctor's report. We may sit and study the papers as long as we please, looking wiser than ever man was; the directors may do the same; and what finally do we know? That John Thompson wants to assure his life for £1000, that his friends say his habits are sober and temperate—statements often of doubtful reliability—and the doctor finds he is a good average life. As a rule, I think it will be admitted that we go after all very largely by the advice of the chief medical adviser, who considers all the papers and weighs up the recommendations of the actual examiner. His responsibility is great. We trust our medical officers to make sure that the risks they recommend are of a high standard, as on their opinion we largely base our final decisions. I fancy that in ordinary life assurance we have more acquired than inherited heart trouble, and that consequently the personal is more important than the family history.

Dr. Gibson's final conclusion is that the position in each case must be a matter of trained common-sense. This, I think, is very true, for while the examiner proposes that a life should be treated in a certain way, few doctors are in a position to follow proposers to the end of life and ascertain how far their recommendations have been sound or justified by results. It is in this connection that I think valuable results might be attained, for in the archives of insurance offices there must be no end of statistics, if the doctor and the actuary would combine forces and make fuller use than at present of the data available and of their joint knowledge and experience.

We have specially to thank Dr. Gibson, as a member of a profession in which one seldom knows that his time is his own, for having given us such a valuable paper.

Dr. BYROM BRAMWELL.—As Dr. Gibson has said, the subject before us is one which does not admit of any very great novelty. In a large book on the heart which I published in 1884, I discussed in great detail the pro-

gnosis of heart disease, and came to very much the same conclusions as Dr. Gibson has given us this afternoon. Since that time there have been, of course, certain advances in our knowledge. Of these, Dr. Gibson has emphasised one, the importance of correctly observing the blood pressure; and I agree with the view he has stated on this point, that in some life assurance cases it is a matter of very considerable moment. It is, however, in those cases of high blood pressure which show no obvious sign of heart disease, and which very often turn out to be cases of renal disease, that the use of the sphygmomanometer is so necessary. In cases of valvular heart disease where the pressure is materially altered, the other indications are so clear that there is no need of mechanical aid so far as the question of life assurance is concerned.

Another group of cases in which modern investigation has done a great deal to clear up our difficulties, although the subject is still a complicated one, are those in which there is irregularity; some of them being absolutely unimportant, while others, as Dr. Gibson has said, are of very great practical importance. These cases are often exceedingly difficult to diagnose, as they depend upon structural changes in the heart muscle.

I shall not attempt to go into detail with regard to all the points that have been brought before us. There are some on which I disagree with Dr. Gibson. He thinks, for instance, that some cases of mitral stenosis are of comparatively little importance and may be accepted with a small extra; in my opinion, all cases of mitral stenosis are of the very greatest importance from the insurance point of view. Any one who has had a large experience of *post-mortem* examinations in cases of heart disease must know that it is a rare thing to meet with cases of mitral stenosis *post-mortem* in the later years of life. Patients with mitral stenosis rarely reach the age of 60. I do not think cases where this condition is present should be accepted except for a short term with a very considerable extra.

I agree in the main, however, with most of Dr. Gibson's statements, and particularly with his view of the importance of the peripheral vessels: the condition of these is of the very greatest practical importance.

I notice that Dr. Gibson has classed apoplexy among the circulatory diseases. No doubt cerebral hæmorrhage is due to the rupture of minute cerebral vessels, but it would be more logical and scientific to class apoplexy under chronic interstitial nephritis. Many cases set down as apoplexy are not due to cerebral hæmorrhage but to thrombosis and softening; these cases should be classed under the head of the diseases of circulation.

One great difficulty which presents itself to the chief medical officer when papers are submitted to him is that of being sure he has got all the facts that are necessary to enable him to form a sound opinion on the life. The proposer is examined, and the papers come before us. We get statements, but can we, in many of the cases, rely on these as facts? The doctor reports, for example, that there is a "slight murmur," or some "slight alteration," adding that it is "of no importance," while all the time it may be of the very greatest importance; and in my opinion the only safe way of doing is, as Mr. Orr has suggested, to have a heart schedule. I may mention that I prepared and introduced such a schedule in connection with my own work a short time ago. The doubtful cases should be examined not only by the medical man who furnishes the usual report, unless he can be completely trusted, but also by an expert or by the chief medical adviser, and then we have, as far as can be, the facts before us on which to form our opinion. But even if we do get an expert—such as Dr. Gibson himself—there are cases in which serious heart trouble may completely escape observation. No one can diagnose disease of the coronary arteries except

by its effects, and that is one of the principal causes of death. Diagnosis of degenerative affections of the heart muscle also is exceedingly difficult, and even, in some cases, impossible; deep-seated aneurysms of small size may be impossible to detect, and even large aneurysms may escape the observation of the general practitioner; the aorta is often not examined so thoroughly as it ought to be.

In my own work I make a practice of dividing the cases that come before me into three classes. *First*, those in which the heart is said to be perfectly normal. In these, however experienced the chief medical officer may be, he has simply to accept the statement as the whole truth. *Second*, those in which there is definite cardiac disease, as shown by the result of the examination of the heart. In these cases the condition is easily detected, and the whole question is whether they are to be rejected or whether they are to be accepted with an extra, and if so, with what extra. And I think the principles laid down by Sir Douglas Powell, and quoted in the paper, are of great assistance here. Take off a certain number of years so as to make the life correspond to the age at which degenerative changes are likely to develop, and fix the extra in proportion to the nature and severity of the lesion. *Third*, in this group I put those cases in which the examiner has found some defect which he characterises as trivial, but in which there can be matter of great importance. These are the cases which give most trouble, and I think the only satisfactory way to act, if you have a suspicion that there is anything serious, is to have the proposer examined by an expert, and a detailed heart schedule filled up.

Dr. AFFLECK.—When I read the paper I had a feeling that it was more suitable for a gathering of medical officers of life assurance companies than for an audience of actuaries. There are so many points of technical detail in it that I felt the Faculty would deserve some sympathy if they failed fully to appreciate the medical standpoint or even to grasp all the medical terms. But Dr. Gibson possesses the happy gift of a bright imagination, combined with a wide culture, which enables him to impart an interest and even a charm to subjects that are of a dry medical nature. And, after all, I think the subject is one that well deserves to be brought under the notice of this Faculty; while it is surely a privilege to have it so brought by one who has given a large part of his medical career to special study in this domain of practical medicine.

With most of the contentions of the paper I think there would be general medical agreement; and on one point at least there would be complete agreement among medical and non-medical persons, namely, the uncertainty that envelops the whole subject, and the difficulty there is in arriving at a basis on which to form conclusions that could be considered satisfactory for our purposes. In no disease are there two cases alike, and this is emphatically so in heart disease, no matter how similar the lesions may be. It is one of the most interesting experiences of medical practice to observe the extraordinary adjustment of the heart to its difficulties, and the manner in which life is sustained and prolonged far beyond what was thought possible. I think the quaint lines of Dr. Watts are appropriate in this connection:—

“Our life contains a thousand springs,
And dies if one be wrong;
Strange that a harp of thousand strings
Should keep in tune so long.”

It is a strange thing indeed that a damaged heart can keep in tune so long by the remarkable power it has of adjustment to its difficulties.

Dr. Gibson's final word is : " We have no better guide in the selection for assurance of proposers suspected of some circulatory disorder than the ordinary methods of diagnosis and prognosis." Each case has to be judged on its merits, and our best resource is clinical observation and experience, and a wide and comprehensive outlook, together with scrupulous conscientiousness in regard to all the material facts. A great drawback lies in our limited opportunities. We do not know the history of the person before us, and I have often thought how greatly it would help us had we an opportunity of seeing those proposers six or twelve months afterwards and ascertaining the effect that the disease was having, how it was being borne and was likely to be borne.

Dr. Gibson referred to the diseases that have a bearing upon the production of organic heart disease, such as scarlet fever and pneumonia. To these I would add influenza : it undoubtedly has very important effects on the integrity of the heart. As to valvular disease, I should like to give my strong support to what Dr. Bramwell has said regarding mitral stenosis. I have had no small experience regarding that particular disease, and I should certainly be chary in admitting a case of mitral stenosis at all, unless under most exceptional circumstances.

As regards disease of the cardiac wall, I am entirely of Dr. Gibson's opinion. Where the integrity of the wall is impaired that is a case which should not be passed. In these cases we have to make a careful summation of many little points that enable us to form what might be called an "informed impression." I mean that there is a something which impresses the mind of the medical man from the concentration of evidence, and this is not quite the same thing as the "trained common-sense" of which Dr. Gibson speaks.

The lesson which this discussion brings home to us is that, inasmuch as the offices generously give a wide margin for human fallibility, it behoves those who enjoy their confidence to exhaust every possible means of arriving at truth in estimating the value of the lives submitted to them.

Dr. RONALDSON (who was unable to be present) had made a request that Dr. Gibson should state his views in regard to murmurs that can be heard on the individual lying down but cannot be heard while he is standing, and also that he should say whether in his experience the circulatory apparatus breaks down earlier in the case of big, heavy men than in the case of those who are spare.

THE PRESIDENT (Mr. GORDON DOUGLAS).—Dr. Gibson has expressed his acknowledgments to the Faculty for the privilege of submitting this paper to us ; but I am sure we all feel that the indebtedness is on the other side, and we must accord him our very hearty thanks. The only statistics Dr. Gibson has been able to give us are those relating to the importance in numbers of diseases of the circulatory system. The conclusions he has set before us are based not on statistics but on experience, and it is in this, I think, that our special indebtedness to him lies, because we know his experience has been very great, seeing that he has made the heart one of his special life studies.

With reference to what we have heard from Dr. Bramwell and Dr. Affleck, we all sympathise with our chief medical officers in the fact that in such a great majority of cases proposers are examined by country doctors who cannot in any way be looked upon as specialists, and our advisers have to form their opinions upon the report of very general observations only. It is essential, therefore, that they should be men of ripe experience, able to sum up cases not only on the meagre particulars supplied regarding par-

ticular diseases or abnormalities, but from all the circumstances surrounding the lives as disclosed in the assurance papers.

We are glad to welcome those members of the medical profession who are with us this afternoon, and I feel we are specially indebted to those who have taken part in the discussion. Their remarks will add greatly to the value of the paper when it is printed in our *Transactions*.

I now formally ask you to accord a very hearty vote of thanks to Dr. Gibson.

DR. GIBSON.—I am very much gratified by the kindness with which you have received me, and I should like particularly to thank those gentlemen who have discussed my paper from the actuarial standpoint. I feel that I have learned a very great deal since I entered this Hall, and I think my views on the subject of heart disease in relation to life assurance are a little less fluid than they were before.

The statistics which Mr. Orr brought forward have afforded me the greatest interest, and I shall make a point of carefully studying them. As regards the framing of a schedule of questions, that would be an admirable matter for the medical officers of the Edinburgh offices to take into serious consideration, and I should be delighted to put myself under any of my seniors who would be willing to take the lead in it. As to the question of pulse pressure, the maximum is ascertained by the amount of force required to stop the blood flowing through the brachial artery, estimated by a mercury manometer, and the minimum is obtained by the point at which the column of mercury shows the greatest oscillations in response to the arterial pulsations.

Mr. Stenhouse brought up some facts as to the greater longevity of those who have suffered from heart disease, and there can be no doubt it is an exemplification of the old saying: "A creaking door hangs long upon its hinges." Still, one may be allowed to hesitate before accepting all that the figures seem to prove in this connection.

The Cambridge work of Michell and several others on the subject of heart strain in athletics has been of the greatest interest to us. In a more humble way I have made some investigations of a similar kind. I was able to have the arterial pressure of several members of the Scottish International Football Team tested before the beginning and also at the conclusion of a match, and it was found that the arterial pressure had sunk to a very low level during the match. On the other hand, as an example of the result of long-continued but gentle exercise, there was the case of a performer who swung Indian clubs for twelve hours daily without the least alteration of the pressure. In this connection I cannot help referring to the fact that the late Mr. Fletcher Norton Menzies, who attained such ripe old age, had been in the Oxford boat about sixty-five years before his death. Athletics cannot be very deleterious!

I am glad to find that my friend Dr. Bramwell is in practical accord with me on most points in the paper. As regards mitral stenosis, I fear I have not made myself quite clear. I rather think when we get a case of a youthful person who has a pre-systolic thrill and murmur without any incompetence of the valve, and without any change in the size of the heart, that we should carefully consider whether the proposal may be accepted for a limited period with a fair extra. Such a case certainly does not fall under the same category as one of aortic incompetence.

As regards cerebral hæmorrhage, I entirely agree with Dr. Bramwell; but I go a little further, because I think chronic nephritis is a general disease involving widespread degeneration of the blood-vessels everywhere, but particularly implicating the renal circulation.

Coming to Dr. Affleck's remarks on the personal factor, I think he struck a very true note indeed when he spoke of the power of adjustment coming in and sometimes entirely reversing opinions we had formed.

I regret Dr. Ronaldson's absence, and in reply to the two questions which he has sent, I may say that I believe the first is answered in the paper. As regards the second, there cannot be a doubt that large, heavy men are more liable to circulatory breakdown than their smaller, sparer brethren.

I have again to acknowledge the pleasure it has given me to submit this paper to the Faculty and to listen to the discussion it has brought out.

CORRESPONDENCE.

CERTIFICATES OF TITLE TO POLICIES OF LIFE ASSURANCE.

To the Editor of the Transactions of the Faculty of Actuaries.

SIR,—In April 1897 a paper by Dr. T. B. Sprague was read before the Institute of Actuaries in which he advocated the issue of Certificates of Title on the request of the Policyholder, after an investigation of the Title by the Solicitor of the Office at the expense of the applicant. The discussion on the paper showed general agreement with this recommendation, and I understand that the practice, though not general, is at present sometimes followed.

Since the paper was read, however, several unlooked-for legal decisions have altered previous conceptions of the security of the Title in certain cases, and the issue of such Certificates of Title may possibly place the Office in an unfortunate position, because the Solicitor's opinion may prove to be erroneous in the light of subsequent legal decisions.

Take the well-known case of the Scottish Life Assurance Company, Ltd. v. John Donald, Limited, (1901). A Policy was taken out under the Married Women's Policies of Assurance (Scotland) Act, 1880, for the benefit of the Life Assured's wife, and was subsequently assigned with the consent and concurrence of the wife. On the death of the Life Assured the widow disputed the validity of the assignment, on the ground (*inter alia*) that the Policy was a provision for her of which she was incapable of depriving herself while the marriage subsisted. This contention was declared to be sound, the Court holding that, in certain circumstances, a wife cannot alienate her interest in such a Policy.

It is plain that an Office which had, previous to this decision, granted a Certificate of Title to the assignee of such a Policy in the full belief that his Title was in order, might find itself in the predicament of having to pay the claim twice over.

It will be sufficient to take one further instance—*In re Robinson*,—Clarkson v. Robinson (*Times Law Reports*, 28th October 1910). This was a case under the Moneylenders Act, 1900. This Act contains seven sections, only the first two of which are material to the present discussion.

The first section deals with the reopening of the transactions of a money-lender in the case of agreements made after the passing of the Act where

the Court considers that the charges are excessive, and that the transaction is harsh and unconscionable.

There is a clause securing the rights of any *bona fide* assignee or holder for value without notice, but it relates to this section only.

The second section---

(1) provides that a moneylender as defined by the Act

(a) shall register his trade name and address or addresses ;

(b) shall carry on the moneylending business in his registered name only and at his registered address or addresses alone ,

(c) "shall not enter into any agreement in the course of his business
" as a moneylender with respect to the advance and repayment
" of money, or take any security for money in the course of his
" business as a moneylender, otherwise than in his registered
" name";

(d) shall on reasonable request and on reasonable payment for expenses furnish a borrower with a copy of any documents relating to the transaction ;

and

(2) fixes penalties of fine or imprisonment for non-compliance with the requirements of this section.

In the case under review, R., the beneficiary under a will, in consideration of £400 paid to him by one Levine, a moneylender, who carried on business under the registered name of Leslie, transferred to Levine £800, part of the share to which he was entitled under the will. The deed purported to be an out-and-out transfer of the £800 to Levine in his individual name, and contained no covenant by R. to pay the £800 or any sum of money or interest. The Court held that, notwithstanding the form of the deed, it was a security for money given to Levine in the course of his business as a moneylender, and as it had not been taken by him in his registered name of Leslie, it was void under Section 2 (1) (c) quoted above. As already indicated, the rights of a *bona fide* holder for value are not protected under this section.

I understand that steps are being taken at present with a view to securing full protection for *bona fide* holders for value claiming under moneylenders, including Insurance Companies in respect of claim and surrender payments, and in respect of loans. Meantime, however, and until a *bona fide* holder has obtained such protection, an Office which, prior to this decision, had given a Certificate of Title, might find itself in a rather awkward situation.

These are two examples of cases where legal decisions adverse to the holder's claim might have been given after he had received from the Office a Certificate that his Title was in order.

In view of the uncertainty caused by the possibility in the future of other unforeseen legal decisions, it would appear to be advisable for an Office, when asked to grant a Certificate of Title, either to reply to the effect that they are not concerned to inquire into the Title until called upon to make some payment under the Policy, or to state that on payment of the necessary fee they will submit the matter to their Solicitor, on the understanding that while the latter's opinion may be regarded as practically final, they do not guarantee that the matter will not be reopened when a payment falls to be made.

An Office is not bound to express any opinion as to the effect or validity of the Title until it is called upon to make payment under the policy. Mr. Wark has pointed out (*T. F. A.* iv. 19) that in view of the decisions in

the case of the *Allgemeine Deutsche Credit Anstalt and others v. The Scottish Amicable Life Assurance Society and others* in Scotland, and in the case of *Honour v. The Equitable Life Assurance Society of the United States* in England, "it may be taken as settled that neither in Scotland nor in England will the Court determine the rights of parties in a life policy during the subsistence of the policy, and that the insurer is not bound to indicate any opinion or make any admission as to the title to a life policy until the policy becomes a claim."

I am,

Yours faithfully,

HUGH W. BROWN.

35 ST. ANDREW SQUARE,
EDINBURGH, 16th December 1910.